

NOTES ON CATOSTOMOID FISHES.

BY HENRY W. FOWLER.

The material forming the basis of the present paper is contained in the Academy of Natural Sciences of Philadelphia.

Cycleptus elongatus (Le Sueur).

One adult from St. Louis, Missouri, and another from Kiskiminitas River, Pennsylvania.

Genus **AMBLONDON** Rafinesque.

This name is allowed to supersede *Ictiobus* Rafinesque, now largely in use. *Ambledon* is based on two species, *Ambledon bubalus* Rafinesque and *Ambledon niger* Rafinesque. Jordan and Gilbert have designated *Ambledon bubalus* Rafinesque (= in part *Aplodinotus grunniens* Rafinesque) as the type,¹ and thus *Ambledon* would become a synonym of *Aplodinotus* according to their ruling. However, as *Ambledon bubalus* Rafinesque, the type species of *Ambledon* Rafinesque, applies primarily to the small-mouthed buffalo, I cannot accept their contention.

MEGASTOMATOBUS subgen. nov.

Type *Sclerognathus cyprinella* Valenciennes.

Mouth large, oblique, terminal, and upper lip about level with lower edge of eye. Lips thin, nearly smooth. Pharyngeals weak.

This name is proposed for the large-mouthed buffaloes as *Sclerognathus* Valenciennes, usually attributed to them, has *Catostomus cyprinus* Le Sueur (its first species) designated as the type by Jordan and Gilbert,² and is thus a synonym of *Carpiodes* Rafinesque.

(Μεγα, large; στομα, mouth; βους, buffalo.)

Ambledon cyprinella (Valenciennes).

Four from Leavenworth, Kansas; four from Wheatland, Iowa.

Ambledon bubalus Rafinesque.

One from Blue River, Indiana; three from near Leavenworth, Kansas; two from "Western United States"; three without data.

¹ *Proc. Acad. Nat. Sci. Phila.*, 1877, p. 85.

² *L. c.*, p. 89.

Carpiodes carpio (Rafinesque).

Carpiodes nummifer Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 484. Wabash River, Indiana.

No. 6,645, A. N. S. P., type of *Carpiodes nummifer* Cope. Wabash River, Indiana. E. D. Cope.

Also three others from the Wabash River; two from Calhoun, one from Brownsville, and one from St. Joseph, Missouri; one from the Platte River, Nebraska; one without data.

This species has never been recorded from Pennsylvania, as it is not mentioned by Cope, and Bean includes it as hypothetical. Its admission to this fauna is now certain, as two examples from the Beaver River, secured by Cope in 1880, are before me. As it is said to be an inhabitant of our larger western streams or rivers, seldom entering the smaller ones, its extinction, if not already accomplished, is very likely inevitable in western Pennsylvania.

Carpiodes thompsoni Agassiz.

One from Lake Erie and another from Saginaw Bay, Michigan.

I secured an example at Erie, Pennsylvania, on July 5th, 1907, besides examining several others at this place the same time. These examples are the basis of the only positive record for this species in Pennsylvania limits.

Carpiodes cyprinus (Le Sueur).

Seven examples from the Conestoga Creek in Lancaster County, Pennsylvania. It is known to the fisherman at Octoraro, Conowingo, and Bald Friar, along the Susquehanna in Maryland, usually as "white carp" or "Susquehanna carp."

Carpiodes tumidus Baird and Girard.

Large example from Tampico, Mexico; two small examples without data.

Carpiodes difformis Cope.

Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 480. Wabash River, Indiana.

No. 22,093, A. N. S. P., type, Wabash River, Indiana. E. D. Cope.

One from "Port Beido"; one without data.

This species has not been definitely recorded from Pennsylvania by Cope, though mentioned as likely to occur. One before me from the Youghiogheny River, in western Pennsylvania, and secured by Cope, assures its admission to our fauna.

Carpiodes cutisanserinus Cope.

Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 481. Kiskiminitas River, western Pennsylvania.

No. 6,649, A. N. S. P., type. Kiskiminitas River, western Pennsylvania. E. D. Cope.

Known only from the type. Though united with *Carpiodes difformis* by some writers, it is evidently a distinct species, as pointed out by its describer. It differs chiefly in the position of the mouth, which opens in front anterior to the nostrils, though its peculiar snub-nosed physiognomy is very suggestive of *Carpiodes difformis*.

Carpiodes velifer (Rafinesque).

One from the Wabash River, Indiana, and another from the Blue River, Indiana?.

Two examples from the Youghiogeny River, secured by Cope, are the basis of the first definite record for the species in that stream in Pennsylvania.

Carpiodes selene Cope.

Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 481. Root River, Michigan?.

Nos. 6,647 (type) and 6,648, A. N. S. P., cotypes. Root River, Michigan?. E. D. Cope.

This appears to be a distinct species, and not at all identical with *Carpiodes thompsoni*, as suggested by some writers. Its affinities are with *Carpiodes difformis* and *Carpiodes cutisanserinus*, as pointed out by Cope.

Carpiodes elongatus Meek.

Four examples from Del Rio, Texas. These were wrongly identified by me as *Carpiodes grayi* Cope.³

NOTOLEPIDOMYZON subgen. nov.

Type *Pantosteus arizonæ* (Gilbert) Jordan and Evermann.

Scales along predorsal region and back all well enlarged, less than twenty between the occiput and origin of dorsal, and contrasting with the small scales in the lateral line.

A single species, in the Gila basin.

(Νοστος, back; λεπίς, scale; μύζαω, to suck; with reference to the large dorsal scales anteriorly.)

Pantosteus arizonæ (Gilbert) Jordan and Evermann.

Eight from the Rio San Francisco in the Gila Basin, New Mexico.

Pantosteus generosus (Girard).

Two from the Weber River at Echo, and one from Logan, Utah. Also two from "Western United States" (likely Utah?).

Pantosteus plebeius (Baird and Girard).

Catostomus plebeius Baird and Girard, Proc. Acad. Nat. Sci. Phila., 1854, p. 28. Rio Membres, basin of Lake Guzman, Mexico.

No. 6,786, A. N. S. P., co-type of *Catostomus plebeius* Baird and

³ Proc. Acad. Nat. Sci. Phila., 1904, p. 242.

Girard. Rio Membres, Mexico. J. H. Clark. From the Smithsonian Institution (No. 168).

Eight from Watrita Creek, Colorado; five from Nutria and two from Fort Wingate, New Mexico.

Pantosteus santa-anæ Snyder.

Proc. U. S. Nat. Mus., XXXIV, 1908, p. 33. Santa Ana River, near Riverside, California.

No. 39,129, A. N. S. P., paratype. Riverside, California. Prof. J. O. Snyder.

Pantosteus delphinus (Cope).

Two from Provo, Utah.

Catostomus latipinnis Baird and Girard.

One from Fort Bridger, Wyoming.

It may be stated that *Eurystomus* Rafinesque proposed in 1820 is preoccupied by Viellot in 1816, and *Acomus* Girard proposed in 1856 is preoccupied by Reichenbach in 1852. Both Viellot and Reichenbach's names were used for birds. Thus *Eurystomus* and *Acomus* are very fortunately erased as subgenera of *Catostomus*.

Catostomus retropinnis Jordan.

One hundred and ten examples from the Yellowstone River at Camp Thorne.

Catostomus occidentalis Ayres.

Catostomus labiatus Ayres, Proc. Cal. Acad. Sci., 1855, p. 32. Stockton, California.

No. 6,741, A. N. S. P., typical? of *Catostomus labiatus* Ayres. Sacramento River at Stockton, California. W. O. Ayres.

A smaller example from the same donor labelled "California," and another from the Russian River in California (Cope). These all agree in the small scales on the belly, between 65 and 70 counted from the gill-opening anteriorly to the ventral origin. The figure of *Catostomus occidentalis* given⁴ by Evermann and Meek does not agree with these examples, as both it and that of *Catostomus tsilcoosensis* Evermann and Meek show the breast naked and the scales on the lower part of the abdomen not smaller than those just below the lateral line.

Catostomus occidentalis humboldtianus (Snyder).

Catostomus humboldtianus Snyder, Bull. Bur. Fisher., XXVII, 1907, p. 163, fig. 1. Bear, Eel and Mad Rivers, California.

Nos. 39,131 and 39,132, A. N. S. P., paratypes of *Catostomus humboldtianus* Snyder. Mad Creek, Oregon. Prof. J. O. Snyder.

⁴ Bull. U. S. F. Com., XVII, 1897 (1898), p. 69.

Catostomus occidentalis lacus-anserinus subsp. nov.

Catostomus labiatus (part) Cope, Proc. Acad. Nat. Sci. Phila., 1883, p. 150.
Goose Lake, Oregon. (Not of Ayres.)

Head 4; depth $4\frac{1}{3}$; D. iv, 10, 1; A. iii, 6, 1; P. i, 15; V. i, 9; scales 66 in lateral line to caudal base, and 4 more on latter; 14 scales above lateral line; 11 scales below lateral line to ventral origin; 9 scales below lateral line to anal origin; 40 scales before dorsal; head width $1\frac{2}{5}$ its length; head depth at occiput $1\frac{2}{5}$; snout $2\frac{1}{5}$; eye 7; mouth width 6; maxillary $3\frac{1}{3}$; interorbital $2\frac{2}{5}$; first branched dorsal ray $1\frac{1}{3}$; first branched anal ray 1; least depth of caudal peduncle $2\frac{1}{2}$; upper caudal lobe 1; pectoral $1\frac{1}{5}$, ventral $1\frac{2}{5}$.

Body elongate, rather robust, sides moderately compressed, upper profile a little more convex than lower, greatest depth at dorsal origin, and all edges convex. Caudal peduncle compressed, its least depth $1\frac{1}{2}$ its length.

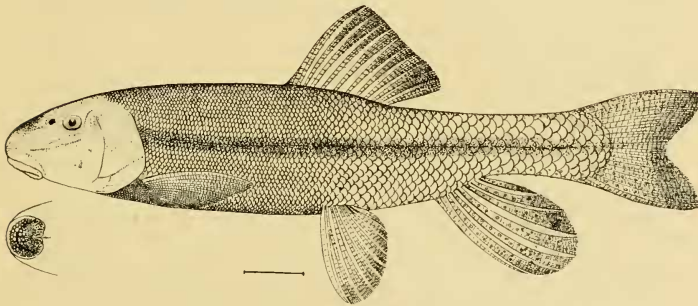


Fig. 1.—*Catostomus occidentalis lacus-anserinus* subsp. nov.

Head moderate, quite robust, sides compressed with slightly convex surfaces, and upper and lower surfaces equally broad. Snout elongate, conic, upper profile with rather deep depression anteriorly, length about equals width. Eye high, a little elongate or ellipsoid, and centre midway in head length. Mouth small, inferior, snout protruding beyond mandible about half an eye-diameter. Jaws with quite fleshy edges, that of upper somewhat trenchant, and lower broadly obtuse. Disk of lips quite large, length $1\frac{1}{2}$ in snout. Upper lip quite broad, rather thin, slightly protruding in front beyond snout tip, with two or three series of quite large inner papillæ, and four or five series of outer and much smaller ones. Lower lip cleft medianly behind nearly forward to symphysis, thick, fleshy, and with about

seven series of papillæ at widest part, median inner ones largest. Tongue thick, little developed, not free, well back. Mandibular rami short, high in mouth. Nostrils large, together, posterior much larger, directly before and close to eye, so that frenum falls about last fourth in snout length. Interorbital broadly convex. Preorbital about $1\frac{1}{2}$ in snout, its width about half its own length. Infraorbital much narrower than preorbital. Preopercular ridge obsolete and vertical. Opercle smooth, width about $1\frac{1}{3}$ its depth. Occipital fontanelle well developed, extends forward close behind level of hind eye margins, rather narrow.

Gill opening extends forward for last fourth in head. Gill-rakers $11+7$, 6, upper ones lanceolate, about $\frac{1}{3}$ length of longest filaments, and all flexible. Filaments $2\frac{1}{4}$ in snout. Pseudobranchiæ much smaller than filaments. Pharyngeal bones rather small, with moderately small teeth below but gradually enlarged above till uppermost 6 much larger, cuneate, compressed, and all uniserial. Isthmus broad. Branchiostegals 3, robust, subequal.

Scales all smaller and more crowded on anterior portion of body, those on breast much smaller and completely covering that region. Scales on belly much smaller than those on predorsal region of back. No free axillary scaly flaps, scales in those regions all adnate. Body scales distributed in longitudinal series parallel with lateral line. Latter complete, extends in nearly straight course along side medianly and each tube well exposed back nearly to hind edge of scale, where it ends often with a slight notch or emargination. Rays of anal and lower lobe of caudal each with a series of well-spaced tubercles, and scales along lower surface of caudal peduncle also show traces of similar tubercles, possibly one to each scale.

Dorsal origin very slightly nearer snout tip than caudal base, first branched ray longest or reaching back slightly beyond base of last branched ray, and depressed fin extends $1\frac{1}{2}$ to caudal base. Anal inserted about opposite hind end of depressed dorsal, rays all greatly branched distally, and depressed fin extends back slightly beyond caudal base. Caudal moderate, well emarginated behind, and lobes with rounded ends. Pectoral low, rather broad, extends back $1\frac{2}{3}$ to ventral origin. Latter inserted just behind base of third branched dorsal ray, fin $1\frac{1}{4}$ to anal origin and depressed hind edge slightly emarginated. Vent close before anal.

Color in alcohol largely dull brownish, lower surfaces pale creamy-brown. Head pale brown, much lighter below. Lips pale like lower surface of head. Iris brassy, pupil slaty. Along side of body medianly from behind gill-opening to caudal base, also largely

including lateral line in its course, a distinct dusky streak, and though ill-defined above, and below along its edges, its width equals at least two eye-diameters. At caudal base it is slightly reflected out on base of that fin. Dorsal and caudal otherwise largely tinted with brownish. Other fins pale or more or less tinted like belly. Pectoral slightly brownish above and towards its tip.

Length $12\frac{1}{8}$ inches (caudal tips slightly damaged).

Type, No. 19,990, A. N. S. P. Goose Lake, Oregon. 1879.
E. D. Cope.

Only known from the above example. It differs from *Catostomus occidentalis* in the dark lateral streak. The very small scales on the body from the throat to the ventral origin number about 80 in series, while my examples of *C. occidentalis* show between 65 and 70 (Named for Goose Lake, Oregon.)

Catostomus snyderi Gilbert.

Head $4\frac{1}{5}$ to $4\frac{2}{5}$; depth $4\frac{2}{5}$; D. iv, 10, 1; A. iii, 6, 1; scales (pockets) about 60? in l. l. to caudal base, and 4 more on latter; 12 scales above l. l.; 8 scales below l. l. to anal origin; 31 to 33 predorsal scales; snout $2\frac{1}{5}$ to $2\frac{1}{4}$ in head; eye 6 to $6\frac{1}{2}$; mouth width $4\frac{1}{3}$ to $4\frac{2}{5}$; interorbital $2\frac{1}{3}$. Gill-rakers 16+10, 8. Scales between front of isthmus and ventral origin 43 or 44. Length 15 and $16\frac{3}{4}$ inches. Two examples from Klamath Lake, Oregon, from E. D. Cope, in 1879.

Cope's reference to Klamath Lake material as *Catostomus labiatus*⁵ cannot refer to these specimens. He later states that his largest example is twelve inches long, and gives the following points at variance: "Scales, 10—74—11; radii D. 1, 11; V. 10; head 4.5 times in length; eye 5.5 in head."

Prof. Snyder has kindly examined two typical examples in Stanford University. They are from the upper Klamath Lake. He writes as follows: "Scales in lateral line, to end of last vertebra, 74—72; scales on base of caudal, beyond the above 3—3; scales between isthmus and origin of ventral, about 40 in one example. The last count is doubtful on account of irregularity in the rows and the poor preservation of the specimens."

Catostomus catostomus (Forster).

Four small examples without data.

Catostomus warnerensis Snyder.

Bull. Bur. Fisher., XXVII, 1908, p. 81. Warner Creek, sloughs south, and Honey Creek, Oregon.

No. 39,130, A. N. S. P., paratype. Warner Creek, Lake County, Oregon. Prof. J. O. Snyder.

⁵ Proc. Acad. Nat. Sci. Phila., 1883, p. 150.

The other examples were all obtained by Cope, who records them as *Catostomus tahoensis*.⁶ They include three from Warner's Third Lake, in Oregon, and one from high land between Warner's Lake and Goose Lake; three from Pyramid Lake, Nevada.

Catostomus commersonnii (Lacépède).

Catostomus alticolus Cope, Proc. Amer. Philos. Soc. Phila., XI, 1874, p. 138.
Twin Lakes, Colorado.

Nos. 18,729 and 18,730, A. N. S. P., paratypes of *Catostomus alticolus* Cope. Twin Lakes, head of Arkansas River at 9,500 feet elevation, Colorado. E. D. Cope.

Also numerous other examples examined, though those which I have already recorded elsewhere are not included in the following list of localities. Boston, Massachusetts; Lake Champlain; Lake Erie; Chadd's Ford Junction, Willistown Barrens, Langford Run, Whetstone Run, Collar Brook, Collingdale, Fairmount Park, Sandy Run, Willits Run (all near Philadelphia), Saucon Creek, Monocacy Creek and Lime Kiln Run near Bethlehem, and North Branch of Altman Creek in Indiana County, Pennsylvania; Deer Creek near The Rocks, Harford County, Maryland; Roanoke River, Holston River and Stroubles Creek in the Kanawha River Basin, Virginia; Catawba and French Broad Rivers, North Carolina; Cleveland, Ohio; Miami River and Richmond, Indiana; Brook River and Fayette, Iowa; Marshfield and Calhoun, Missouri; "Clopell River" in 1873.

Catostomus commersonnii sucklii (Girard).

Twenty-four examples from Camp Thorne, Yellowstone River (E. D. Cope). These all agree in having the dorsal origin inserted midway between the snout tip and the caudal base, a character virtually expressed in Girard's original description. Compared with numerous examples of *Catostomus commersonnii*, the dorsal origin was found in all examples examined, except the very young, nearer the snout tip than the caudal base.

Catostomus ardens Jordan and Gilbert.

One from Utah Lake (E. D. Cope in 1882), Utah. Nine from Snake River at Springfield, Bingham County (Dr. Henry Skinner in August, 1906), Idaho.

Catostomus gila Kirsch.

One from New Mexico (E. D. Cope in 1872), and three more from the same State in the Rio San Francisco of the Gila Basin, Arizona.

⁶ Proc. Acad. Nat. Sci. Phila., 1883, p. 152.

Catostomus insignis Baird and Girard.

Proc. Acad. Nat. Sci. Phila., 1854, p. 28. Rio San Pedro, Arizona.

No. 6,785, A. N. S. P., type. Rio San Pedro, Arizona. J. H. Clark. From the Smithsonian Institution (No. 169).

Catostomus nigricans Le Sueur.

Many examples from: North Branch of Altman Creek, Indiana County, Pennsylvania; West Branch of Deer Creek, Harford County, Maryland; Roanoke River, Holston River and Sinking Creek, Virginia; Coal Creek, North Carolina; Cumberland River, Tennessee; Miami River and Richmond, Indiana; Brook River and Des Moines, Iowa; Marshfield, Missouri. Besides these many others which I have recorded elsewhere.

Lipomyzon liorus (Jordan).

Three from Utah Lake (E. D. Cope in 1882), Utah: In the original account of *Chasmistes* Jordan,⁷ *Catostomus fecundus* Cope and Yarrow is designated as the type. This action appears to me sufficient for an *a priori* claim to the definition. The latter was afterwards pointed out to refer to the present genus, with *Chasmistes liorus* Jordan as its type.⁸ *Chasmistes liorus* Jordan was also confused originally by its describer⁹ with *Catostomus fecundus* Cope and Yarrow. Though this latter species is correctly allowed in *Catostomus*, possibly *Chasmistes* may stand as a distinct subgenus, being distinguishable from the others by its pointed snout above. In any case *Chasmistes brevis* Cope cannot be included with it, wrongly so suggested by Jordan and Evermann,¹⁰ as it has been designated¹¹ the type of *Lipomyzon*, the only name available for the present large-mouthed forms.

Lipomyzon brevis (Cope).

Chasmistes brevis Cope, Amer. Nat., XIII, 1879, p. 785. Klamath Lake, Oregon.

No. 20,959, A. N. S. P., cotype (type) of *Chasmistes brevis* Cope. Klamath Lake, Oregon. E. D. Cope.

No. 20,522, A. N. S. P., cotype, same data.

The statement made by Cope that this species differs from *Delistes luxatus* in having the snout "without the hump produced by the protuberant premaxillary spines" is not true. Both of my examples show something of a hump, though much more obtuse and smaller

⁷ Bull. Geol. Surv. Hayden, IV, 1878, p. 417.

⁸ Jordan and Gilbert, Bull. U. S. Nat. Mus., No. 16, 1882, p. 131.

⁹ Jordan, l.c., No. 12, 1878, p. 150.

¹⁰ L.c., No. 47, I, 1896, p. 199.

¹¹ Jordan and Gilbert, l.c., No. 16, 1882, p. 131.

than in *Deltistes*. Gilbert mentions two Klamath Lake species of *Chasmistes*. *Chasmistes stomias* Gilbert¹² "has a larger, deeper head, with larger, more obliquely placed mouth, and conspicuously protruding premaxillary spines." The scales are 76 to 82, and thus this nominal form appears more clearly identical with *Chasmistes brevirostris* than the form he lists under that name.¹³ *Chasmistes copei* Evermann and Meek¹⁴ has 80 scales, and is said to differ from *Chasmistes stomias* Gilbert in "its larger head, larger, more oblique mouth, less prominent snout, and very small fins. The differences in the fins are very great, particularly in the ventrals." In the case of Gilbert's figure of *Chasmistes stomias* a spawning-fish is shown, thus the ventrals and anal are unusually long. *Chasmistes chamberlaini* Rutter¹⁵ agrees with all the forms of *Lipomyzon*, so far as known, in having the lower lip united at the mandibular symphysis, and differs in having 93 scales.

PITHECOMYZON subgen. nov.

Type *Chasmistes cujus* Cope.

Differs from subgenus *Lipomyzon* Cope in the large scales, these about 65 in the lateral line (70 to 90 in *Lipomyzon*).

(*Πιθρῆζος*, ape, with reference to the short snout; *μύζαω*, to suck.)

Lipomyzon cujus (Cope).

Chasmistes cujus Cope, Proc. Acad. Nat. Sci. Phila., 1883, p. 149. Pyramid Lake, Nevada.

No. 20,523, A. N. S. P., type of *Chasmistes cujus* Cope. Pyramid Lake, Nevada. E. D. Cope. It only measures 17 inches, which may be due to the body having been skinned out and shrinking in alcohol. Cope gives the eye as $8\frac{1}{2}$, likely the actual diameter of the eye and not the orbital socket.

Deltistes luxatus (Cope).

Chasmistes luxatus Cope, Amer. Nat., XIII, 1879, p. 784. Klamath Lake, Oregon.

No. 20,555, A. N. S. P., cotype (type) of *Chasmistes luxatus* Cope. Klamath Lake, Oregon. E. D. Cope.

No. 20,960, A. N. S. P., cotype, same data, in poor preservation.

Xyrauchen texanus (Abbott).

Catostomus texanus Abbott, Proc. Acad. Nat. Sci. Phila., 1860, p. 473. Colorado and New Rivers.

No. 16,993, A. N. S. P., type of *Catostomus texanus* Abbott.

¹² Bull. U. S. F. Com., XVII, 1897 (1898), p. 5, fig.

¹³ L.c.

¹⁴ L.c., p. 70, fig.

¹⁵ L.c., XXII, 1902 (1904), p. 147. Eagle Lake, California.

"Colorado and New Rivers." Dr. J. L. Le Conte. In locating this interesting dried example, it is now possible to give its correct place among the catostomoids after fifty-two years of oblivion and erroneous identification. It is unquestionably identical with *Catostomus cypho* Lockington, which was also described in these PROCEEDINGS twenty years later,¹⁶ and Lockington's specific name is the one adopted by all writers, as it was thought to have been the first ever given to this peculiar fish. Jordan says¹⁷ "*Catostomus texanus* Abbott is less clear [than *Catostomus chloropteron* Abbott], but what there is of specific characterization in the description points to *C. teres*. The dorsal carination is frequently observed in stuffed fishes in which some flesh is left in the back to shrink in drying, leaving the back 'carinated.'" These entirely erroneous suggestions were made, of course, shortly before the species was supposed to have been discovered by Lockington. Still further confusion is added by its inclusion as a synonym of *Moxostoma congestum* (Baird and Girard) by Jordan and Evermann.¹⁸ The specific name *texanus* is unfortunate, as the species is not known from Texas. It appears to have been given under the impression that the Colorado River of that State was intended, together with the New River being likely confused with the Neuces River?.

Besides the above example is another specimen from the Hardy River in Lower California, secured by Mr. S. N. Rhoads in February of 1905. It is important as showing to what extent variation may reach in the species. It has 86 scales in the lateral line to the caudal base, and 5 more on the latter. The type shows 73 scales in the lateral line to the caudal base and 4 more on the latter. As both are adult examples, it would appear hardly likely that *Xyrauchen uncomphagre* Jordan and Evermann is a distinct species, as it is said to have but 81 scales, with other characters apparently varietal or due to age.

Erimyzon sucetta (Lacépède).

Moxostoma kennerlyi Girard, Proc. Acad. Nat. Sci. Phila., 1856, p. 171.
Dry Creek, Victoria, Texas.

No. 6,797, A. N. S. P., cotype of *Moxostoma kennerlyi* Girard.
Dry Creek, Victoria, Texas. Dr. C. B. Kennerly. From the
Smithsonian Institution (No. 161).

¹⁶ Proc. Acad. Nat. Sci. Phila., 1880, p. 237. Colorado River at the junction of the Gila.

¹⁷ Bull. U. S. Nat. Mus., No. 12, 1878, pp. 167, 169.

¹⁸ Bull. U. S. Nat. Mus., No. 47, I, 1896, p. 192.

Also an example from Thomasville (J. A. G. Rehn on March 25, 1904), Georgia.

Erimyzon sucetta oblongus (Mitchill).

Moxostoma claviformis Girard, Proc. Acad. Nat. Sci. Phila., 1856, p. 171.
Coal Creek, Canadian River, Indian Territory.

No. 6,798, A. N. S. P., cotype of *Moxostoma claviformis* Girard. Coal Creek, Canadian River, Indian Territory. H. B. Möllhausen. From the Smithsonian Institution (No. 165).

Besides the very large series of examples from numerous localities in the Middle Atlantic States, are others from: Richmond, Virginia; Hicksville, Ohio; Marshfield, Missouri; Fort Smith, Arkansas.

Minytrema melanops (Rafinesque).

Ptychostomus pidiensis Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 471. Yadkin River, North Carolina.

Nos. 6,968 (type) to 6,970, A. N. S. P., cotypes of *Ptychostomus pidiensis* Cope. Yadkin River, North Carolina. E. D. Cope. These examples are undoubtedly the present species, as they show the air-vessel in two compartments, and the bases of the scales spotted. The adults Cope mentions in his description evidently were not preserved, as they are not in his collections.

Also one from the Ohio River, one from Indiana, one from Del Rio in Texas, and one from Hartford in Arkansas. The last, a very young example, I wrongly identified as *Catostomus nigricans*.¹⁹

Forbes and Richardson state²⁰ that this species ranges on "the Atlantic Slope from New Jersey to North Carolina," though there is no evidence whatever of its occurrence in New Jersey, so far as I know of. Further, in view of the lack of detail, the single record for its occurrence in the Susquehanna River basin may also be questioned.

Moxostoma anisurum (Rafinesque).

Ptychostomus velatus Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 470. Youghiogheny River, Pennsylvania.

Nos. 6,954 (type) and 6,955, A. N. S. P., paratypes of *Ptychostomus velatus* Cope. Youghiogheny River, Pennsylvania. E. D. Cope.

One from the Beaver River (Cope in 1880), Pennsylvania; one from the Blue River and another from the Wabash River, Indiana. The last example was identified by Cope with the following species, but it has a slightly larger mouth and lips.

¹⁹ Proc. Acad. Nat. Sci. Phila., 1904, p. 243.

²⁰ Fishes of Illinois, 1908, p. 83.

Moxostoma collapsum (Cope).

Ptychostomus collapsus Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 471. Neuse, Yadkin and Catawba Rivers, North Carolina.

Nos. 6,949 (type) and 6,950, A. N. S. P., cotypes of *Ptychostomus collapsus* Cope. Neuse River, North Carolina. E. D. Cope.

Also two others "without locality, but probably from the Western States or Great Lakes" (Cope).

Moxostoma congestum (Baird and Girard).

Four from Del Rio, Texas.

Moxostoma austrinum (T. H. Bean).

Three from Rio Verde, Mexico.

Moxostoma robustum (Cope).

Ptychostomus robustus Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 473. Yadkin River, North Carolina.

Head $4\frac{3}{4}$; depth $3\frac{3}{4}$ to $3\frac{7}{8}$; D. IV, 11, 1, or IV, 12, 1; A. III, 6, 1; V. all 1, 8; scales 41 to 45 in lateral line to caudal base, and 3 more on latter; 6 or 7 scales above lateral line; 5 scales below lateral line; 15 to 17 predorsal scales; snout $2\frac{1}{2}$ to $2\frac{3}{4}$ in head; eye 4; mouth width $4\frac{1}{2}$ to $5\frac{1}{2}$; interorbital 2; length $10\frac{1}{4}$? to $11\frac{1}{8}$ inches. No. 6,958 and 6,959, A. N. S. P., cotypes? of *Ptychostomus robustus* Cope. Yadkin River?, North Carolina. E. D. Cope.

These examples agree with Cope's account in the compressed and rather stout body, moderate head and few dorsal rays.

Moxostoma erythrurum (Rafinesque).

Ptychostomus bucco Cope, Rep. Geol. Surv. Wyom. Hayden, 1870 (1871), p. 437. St. Joseph, Missouri.

Nos. 6,961 to 6,964, A. N. S. P., cotypes of *Ptychostomus bucco* Cope. St. Joseph, Missouri.

Three without data; forty-nine from the Holston River, Virginia; two from the Catawba River and three from the French Broad in North Carolina; twelve from the Blue River and one from the Wabash River, Indiana; one from Sedalia, Missouri; one from Ottumwa, Iowa.

Also a large series of Pennsylvania material from the Youghiogheny River, Kiskiminitas River and Indiana County at Cowanshancoc, Elders Run, Grant Township, Home Run in Payne Township, Indiana, Pine Township and Cherry Run. Most of these have been recorded as *Moxostoma aureolum*, in accordance with subsequent restriction to that by Cope in 1870. An examination of all the material before me, however, appears to justify Cope's conclusions, and for that reason I allow the large-headed species to fall with

Rafinesque's name. The *Ptychostomus bucco* Cope is certainly identical with the present species.

Moxostoma macrolepidotum (Le Sueur).

Five from the Conestoga Creek in Lancaster County in Pennsylvania, and two other examples without data likely were from the same locality?. Also an example in the collection from the Washington Market.

I neglected to admit this species in my list of Delaware fishes, though Cope had recorded it in 1870 without definite locality. Along the Susquehanna River, in Maryland, it is known to some of the fishermen, though is said to be less common than any of the catostomoids. In Delaware, the fishermen know it along Broad Creek at Laurel and Bethel.

Moxostoma aureolum listed by Jordan²¹ from Carlisle in Pennsylvania must be this species.

Moxostoma lachrymale (Cope).

Ptychostomus lachrymalis Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 474. Neuse River, North Carolina.

Head $4\frac{3}{4}$; depth $3\frac{7}{8}$; D. IV, 11, 1; A. III, 6, 1; both V, 1, 8; scales 43 in lateral line to caudal base, and 3? more on latter; 6 scales above lateral line; 5 scales below lateral line; 16 predorsal scales; snout $2\frac{1}{4}$ in head; eye $4\frac{3}{8}$; mouth width $5\frac{1}{2}$; interorbital $2\frac{1}{8}$; length $12\frac{1}{4}$ inches. No. 6,848, A. N. S. P., type? of *Ptychostomus lachrymalis* Cope. Neuse River, North Carolina. E. D. Cope.

This example seems to differ from the preceding, as pointed out by Cope, and may therefore be allowed as distinct.

Moxostoma duquesnei (Le Sueur).

One example from the Youghiogheny River (Cope) and another from a branch of the Big Mahoning Creek in Indiana County, the latter recorded by me as *Moxostoma aureolum*.²²

Following Cope's restriction, this species is allowed distinct and identical with Le Sueur's fish, it being open to doubt that the latter had *Placopharynx*. *Moxostoma duquesnei* is thus seen to have more numerous scales in the lateral line than most of the species of the genus. Other small-scaled nominal species, as *Moxostoma lesueurii* (Richardson)²³ and *Moxostoma alleghaniensis* Nichols,²⁴ are either identical or very closely allied.

²¹ Bull. U. S. Nat. Mus., No. 12, 1878, p. 124.

²² Proc. Acad. Nat. Sci. Phila., 1912, p. 47.

²³ Catostomus lesueurii Richardson, Franklin's Journal, 1823, p. 772.

²⁴ Bull. Amer. Mus. N. Hist. N. Y., XXX, 1911, p. 275. Pl. 11, fig. 1. Marshall, North Carolina.

Moxostoma aureolum (Le Sueur).

In the Cope Collection are one: from Saginaw Bay in Michigan, one from the "Southern States," one from the Wabash River in Indiana, one from the Neuse River in North Carolina, and five from Tennessee.

As contended by Cope, this species differs from *Moxostoma erythrum* in the smaller head. All show: Head $4\frac{1}{3}$ to $4\frac{7}{8}$; depth $3\frac{2}{3}$ to $3\frac{3}{4}$; D. usually iv, 12, 1, occasionally iv, 11, 1; A. iii, 6, 1; all V. 1, 8; scales 39 to 45 in lateral line to caudal base and 3 more on latter; usually 7 scales above lateral line, seldom 6 or 8; usually 5 scales below lateral line, seldom 6; predorsal scales usually 16, sometimes 15 or 17, rarely 20; snout $2\frac{1}{6}$ to $2\frac{3}{4}$ in head; eye 4 to 5; mouth width 4 to 5; interorbital $2\frac{1}{10}$ to $2\frac{1}{4}$; length $10\frac{1}{8}$ to 18 inches.

Moxostoma crassilabre (Cope).

Ptychostomus crassilabris Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 477. Neuse River, near Raleigh, North Carolina.

Head $4\frac{3}{4}$; depth $3\frac{7}{8}$; D. iv, 11, 1; A. iii, 6, 1; both V. 1, 8; scales 43 in lateral line to caudal base, and 3? more on latter; 6 scales above lateral line; 5 scales below lateral line; 16 predorsal scales; snout $2\frac{1}{2}$ in head; eye $4\frac{2}{3}$; mouth width $5\frac{1}{2}$; interorbital $2\frac{1}{8}$; length $12\frac{1}{4}$ inches. No. 6,960, A. N. S. P., type of *Ptychostomus crassilabris* Cope. Neuse River, near Raleigh, North Carolina. E. D. Cope.

Moxostoma breviceps (Cope).

Ptychostomus breviceps Cope, Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 478. Youghiogheny River, Pennsylvania.

Head $5\frac{1}{3}$; depth 4; D. iv, 12, 1; A. iii, 6, 1; scales 42 in lateral line to caudal base and 3 more on latter; 7 scales above lateral line; 5 scales below lateral line; 16 predorsal scales; snout $2\frac{1}{6}$ in head; eye 4; mouth width $4\frac{3}{4}$; interorbital $2\frac{1}{6}$; length $10\frac{3}{4}$ inches. No. 22,104, A. N. S. P., type of *Ptychostomus breviceps* Cope. Youghiogheny River, Pennsylvania. E. D. Cope. The anal rays, as suspected by Cope, are abnormal, and I have seen similar cases in other examples of the members of the present genus.

An example from the Neuse River, North Carolina, differs from the above in the following: depth $4\frac{1}{3}$; D. iv, 11, 1; snout $2\frac{1}{3}$ in head; eye $3\frac{7}{8}$; mouth width $4\frac{1}{8}$; interorbital 2; length $11\frac{7}{8}$ inches.

SCARTOMYZON subgen. nov.

Type *Ptychostomus cervinus* Cope.

Branched dorsal rays 9 to 11, usually 9 or 10. Body long, slender,

but slightly compressed. Head rather small. Eye rather large. Mouth moderate. Dark lateral streaks.

This subgenus differs from the others (*Moxostoma* and *Teretulus*) in the much fewer dorsal rays and coloration. The single species lives in swift and rapid streams, about rock pools, in the southern Alleghanies.

(Σκάρτης, jumper; μύζιδω, to suck; as the typical species is known as "Jumping Mullet.")

Moxostoma cervinum (Cope).

Ptychostomus cervinus Cope, Journ. Acad. Nat. Sci. Phila., (2), VI, 1868, p. 235, Pl. 3, fig. 4. Catawba River, North Carolina. Roanoke River and James River, Virginia.

Head 4 to $4\frac{1}{3}$; depth $4\frac{1}{3}$ to $5\frac{1}{3}$; D. usually iv, 10, 1, frequently iv, 9, 1, rarely iv, 11, 1; A, III, 6, 1; V. usually 1, 8 (both sides), very rarely 1, 7 (both sides); scales usually 38 to 44 in lateral line to caudal base, though varies 37 to 47, and 3 more on caudal base; usually 6 scales above lateral line, frequently 5, occasionally 7, rarely 8; usually 5 scales below lateral line, frequently 6, rarely 7; usually 15 predorsal scales, often 16, seldom 14, 17, 18 or 19, snout $2\frac{1}{2}$ to $2\frac{7}{8}$ in head; eye $3\frac{1}{4}$ to $4\frac{3}{4}$; mouth width $3\frac{1}{2}$ to 6; interorbital $2\frac{1}{2}$ to 3; length $2\frac{1}{2}$ to $6\frac{5}{8}$ inches. Nos. 6,920 (type) to 6,925, A. N. S. P., cotypes of *Ptychostomus cervinus* Cope. Catawba River, North Carolina. Nos. 6,904 to 6,918, A. N. S. P., cotypes, from headwaters of Roanoke River, Virginia. Nos. 6,928 to 6,946, A. N. S. P., cotypes, from headwaters of the James River, Virginia. All from Cope.

Moxostoma rupiscartes Jordan and Jenkins²⁵ is identical with the present species. All its alleged characters of difference are covered by the very full series of typical examples noted above.

Placopharynx carinatus Cope.

Proc. Amer. Philos. Soc. Phila., XI, 1870, p. 467, figs. (teeth). Lafayette, Wabash River, Indiana.

No. 22,108, A. N. S. P., type. Lafayette, Indiana. E. D. Cope.

Five from Beaver River in Pennsylvania (Cope in 1880), also two adults likely from the same locality. One without data; nine from Cherokee, Iowa; two from Eureka Springs, Arkansas; two from Carthage, Missouri.

²⁵ *Proc. U. S. Nat. Mus.*, 1888, p. 353. Carolina and Georgia.